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INFORMATION REPORT

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CENTRAL INTELLIGENCE AGENCY

COUNTRY: India

REPORT NO. [redacted]

SUBJECT: Production of the New Thorium-Uranium Plant on Trombay Island

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THIS IS UNEVALUATED INFORMATION

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1. The Indian Government's new thorium-uranium plant on Trombay Island near Bombay is now producing [redacted] which is roughly equivalent to a thousand million tons of coal. This is some 30 times the present annual coal production of India. (b)(1) (b)(3) (S)

2. Although the actual output is a [redacted] it is known that capacity has been upgraded several times since trial runs commenced in the third week of July, 1955. The plant will go into production in June, 1956, but the formal opening is not slated to take place until October, 1956.

3. Said to be the only one of its kind in Asia, the Trombay plant, which processes the thorium-uranium cake residue from the Indian Government's other rare-earth factory at Alwaye (Travancore-Cochin), is situated only a few hundred yards from the building which will house India's first "swimming pool" type reactor.

4. The Trombay unit is entirely the work of Indian engineers, originally trained by French experts when the South Indian Alwaye plant was built. It cost around $224,000 and a large part of the equipment now in use is of Indian manufacture. But the alkaline process for the treatment of monazite is the patent of the Societe Chimique des Terres Rares, which also designed some of the plant's cooling apparatus.

5. At Trombay, the crude thorium hydrous oxide cake from Alwaye is dissolved in an excess of hydrochloric acid and the resulting chloride solution is filtered on a plate and frame type filter press to remove insoluble impurities like ilmenite and zircon. The clear filtrate, which contains approximately 60 per cent thorium, is precipitated as a sulphate while most of the rare earths and all the uranium remain in solution. The thorium sulphate is centrifuged in a rubberlined centrifuge and the solution is sent for recovery of thorium, rare earths and uranium which are in solution. This sulphate is not pure enough and is further purified by reprecipitating with 50 per cent sulphuric acid to give a purer thorium sulphate. (b)(1) (b)(3) (S)

6. The pure sulphate is converted to the hydroxide by reacting it with ammonium hydroxide. This is filtered and washed with distilled water. The thorium hydroxide is then dissolved in chemically pure nitric acid to give

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a solution of thorium nitrate in a glass-line evaporator. The molten nitrate is allowed to solidify in aluminum dishes and then packed in glass bottles.

7. The process upgrades the Alwaye thorium cake from 70-80 per cent to 99.999 per cent and also produces a certain amount of uranium. As far as major US producers are concerned, the principal raw material sources for thorium are the monazite placers of Brazil, India and the high grade hydro-thermal deposits in the Union of South Africa. Indian scientists claim the Indian product is superior to that found in the other two countries. Travancore and Madras monazite runs 0.2-0.48 per cent U_3O_8 and 5-11 per cent ThO_2 in sands holding other heavy minerals. Total deposits in the Travancore-Cochin area are estimated to be around 180 thousand tons of ThO_2 but other scattered beaches along the southwest coasts are known to hold a considerable additional tonnage. Concentrations run 5-10 per cent ThO_2.

8. The Trombay plant, jointly owned by the Government of India and the Travancore-Cochin Government, is operated by the autonomous Indian Rare Earths Ltd, which works under the direction of the Atomic Energy Commission. The finished processed product is sold by Rare Earths Ltd in India for $4.84 against the global price of around $3.50. The reason for this is higher production costs, principally of hydrochloric acid, which is four times higher than anywhere abroad.

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(S) 9. [redacted] that if the plant expands anymore, its outer walls will have to be moved backwards. Sale figures, however, indicate that the Government will ask the Rare Earths company to try "one more upgrading soon".

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